
ANNEX C: PRECISION ENGAGEMENT

General

Precision Engagement is the ability of joint forces to locate, discern, and track objectives or targets; select, organize, and use the correct systems to engage or attack; generate desired effects; assess results; and reengage with decisive speed and overwhelming effect, as required, throughout the full range of military operations.

Precision Engagement is effects-based engagement that is relevant to all types of operations. Its success depends on in-depth analysis to identify and locate critical nodes and targets. The pivotal characteristics of Precision Engagement are the linking of sensors, delivery systems, and effects.

Fire Support units, along with Army aviation attack units (covered separately in Annex A, Dominant Maneuver), will remain the Army's premier instruments of force for Precision Engagement. As the Army transforms into a more deployable, lethal, and sustainable force, the systems will increase in lethality yet experience a decrease in logistical support required. The Fire Support structure will migrate from the current heavy artillery force to a highly mobile

force using common smart munitions with greater lethality. The aviation community will transform from proven systems such as the Kiowa/Apache teams of Desert Storm to new systems like the Apache Longbow and the Comanche.

The Army will modernize within a constrained resource environment to meet the needs of Transformation. The Legacy Force will rely on proven systems such as Paladin, the Multiple Launch Rocket System (MLRS), Apache, and Kiowa Warrior, as well as see the introduction of a few selected acquisitions, such as Crusader. The Interim Force will rely on proven technology with some new equipment. The Objective Force will see a complete transformation of the Army's Precision Engagement capability. This force will consist of a Future Combat Systems (FCS) variant designed as a Fire Support platform that delivers highly lethal common munitions in support of the maneuver commander.

This annex provides specific information on surface-based fire support involved in support of the Precision Engagement operational concept.

Fire Support

Overview

When engaged in violence to reach ends, armies pursue their objectives through fires and maneuver. The two are inextricably linked. Maneuver is the effort to achieve a position that inherently affords an advantage over an enemy. Fires are the effects of lethal and nonlethal weapons. When closely coordinated, fires and maneuver yield rapid and decisive results on the battlefield. Fire Support is fires that must be closely coordinated with the actions of ground maneuver forces. Fire Support lays at the critical juncture between fires and maneuver and is thus the key to our maintaining the finest ground fighting force in the world. Fire Support is succinctly defined as “fires that directly support land, maritime, amphibious, and special operation forces to engage enemy forces, combat formations, and facilities in pursuit of tactical and operational objectives.”

-- Joint Pub 3-09

As the Army moves forward through Transformation toward the Objective Force, the Fire Support (field artillery) community will continue to evolve in order to support the force as a whole. Fire Support developments will be based on the cornerstones of soldiers and organizations, enabled by equipment. Future operational concepts dictate that the Army will fight as maneuver and maneuver support “units of action,” packaged or tailored for specific objectives. To meet the requirements and operational constructs of the Objective Force, integrated maneuver and fires must continue to evolve in conjunction with one another. When closely coordinated, maneuver and fires have the ability to deliver precise, discriminatory effects with overmatching speed, range, and lethality. Fire Support provides the critical linkages between fires (lethal and nonlethal) and maneuver and is, therefore, an essential element in maintaining the finest ground fighting force in the world.

Fires are developed as an execution-oriented force that fully leverages battlefield information and situational awareness, which allows ground forces to shape the “deep battle” while assuring victory in the “close fight.” As the Army looks to conduct operations in the future, Fire Support will continue to have dramatic impact throughout the entire battlefield. In the deep fight, operational or shaping fires will be essential in setting conditions for decisive operations. We must isolate the close fight and protect the force while shaping the next fight. In the close fight, maneuver forces will be employed to destroy enemy forces. Fires will allow us to fix and suppress the enemy and thus enable freedom of maneuver. Fires also allow the commander to deliver unique effects that, in turn, complement and reinforce maneuver systems. Capabilities must continue to be developed which will allow us to conduct simultaneous strikes throughout the area of operations.

It is imperative that future Fire Support warfighting Operational and Organizational (O&O) concepts be nested in the Army Vision. To properly align Fire Support systems with Army Transformation, the following imperatives are essential:

- Fires must operate within a joint and combined “system of systems.”
- Fires must have the same strategic deployability and tactical mobility as maneuver.
- Fires must maximize commonality of organizations and equipment.
- Fires must capitalize on munitions lethality to reduce our logistics footprint.
- Fires are dependent on the Army National Guard (ARNG) to provide required combat power.
- Fires must fully leverage information technologies to be relevant.

Challenges abound in developing fires capable of meeting the requirements above. These include:

- Most of our current and emerging capabilities were created to offset the Soviet threat on European terrain. Desert Storm requirements were similar. Future capabilities must be adapted to new requirements.
- Effects were largely dependent on massed fires and area targets. This is not likely to be the case in future requirements.
- There will be a continuing need to engage fleeting targets.

- Many of our current target acquisition assets are not discriminatory in depicting paramilitary and unconventional forces. This is likely to be a future need.
- Fusion of intelligence for targeting is starting to emerge but, in many cases, lacks the real-time speed.
- Many countries have overmatch capabilities in quantity or range for precision strike capability.
- Proliferation of threat forces that can utilize sanctuary positions in conjunction with the protection of urban and complex environments is keyed to the perception of the U.S. aversion of unrestricted collateral damage.

These challenges will generate and necessitate changes of varying degrees that affect Doctrine, Training, Leader Development, Organization, Materiel, and Soldier Systems (DTLOMS). As the Army continues to evolve to meet future requirements, Fire Support must and will continue to evolve as well.

Fire Support Modernization in Support of Transformation

Overview

Fire Support modernization in support of Transformation must consider all aspects of modernization as they apply to the Army Legacy, Interim, and Objective Forces. Legacy Forces must continue to evolve to ensure warfighting capabilities are maintained at all times, allowing us to respond where and when needed. Legacy

systems must remain operationally relevant until formerly retired. Interim and Objective Forces must be developed which not only leverage current and future materiel advances but also those advances generated throughout the entire DTLOMS spectrum. We must begin immediately to develop a force that is fully supports the Army Vision—a force that is **responsive, deployable, agile, versatile, lethal, survivable, sustainable, and dominant.**

To properly develop the requirements of future fires, we must develop a cohesive, comprehensive vision for field artillery. To this end, a number of axes of change have been formulated which continue to evolve. These include the concepts of future tactical fires and effects, unmanned operational reach, munitions centrality, effects-based fires, organizational transformation, and dynamic force tailoring.

Integration of these efforts will provide real-time visibility over all relevant sensors and delivery systems for more responsive and flexible distribution of effects. The need to engage fleeting targets at greater ranges with increased target discrimination is imperative. Fusion of all relevant sensors will generate a vast array of targets; therefore, a dynamic architecture capable of filtering out High Payoff Targets (HPTs) is essential.

A network centric process will be utilized that, when combined with mission tailored units of action employing multiple platform capabilities, will allow us to dynamically

deploy combat power as needed. An embedded decision support structure that will automatically identify and apply Rules of Engagement (ROE) and collateral damage constraints is required. A fused combat assessment will allow us to not only apply complex terrain and urban strike considerations but also provide us with the capability to redirect strikes as needed and then conduct post strike assessments in the target area.

Munitions centrality will shift the burden of terminal effects more to munitions than platforms as it aims to be the primary driver of range and accuracy. Lethality must be increased whereby the concept of “one round, one hit, one kill” becomes a reality. Loitering munitions, rapidly transportable on different carriers (platform independent) and with the potential to offer unmanned fire capability, are essential. However, for munitions to reach maximum effectiveness, delivery platforms must be optimized. Thus, robotic ammunition handling, self-location (i.e., Position Navigator (POSNAV)), technical fire direction, muzzle velocity management and meteorological measurement systems must be inherent on all delivery systems.

One area of immediate concern is the time required to place effects on a designated target. The time required to process a fire mission may be excessive if an effective digital link is not established. Soldiers and units may opt to use voice means and not utilize organic equipment provided. Digital connectivity allows for improved target location, situational awareness,

and the employment of effective sensor-to-sensor strategies.

Another area of concern is the changing nature of effects coordination as it relates to nonlethal information operations (IO). Recent events have strengthened the thought that, as environmental complexity rises, nonlethal IO becomes more important. Present operations allow us to recognize that nonlethal/lethal integration is an extremely bifurcated process. Joint exercises and operations in Kosovo and Bosnia indicate the dramatic need for a targeting-like process. Today, the Fire Support Coordinator (FSCOORD) is routinely tasked with this integration. Senior, experienced leadership must be trained and an enhanced, formal network must be established.

Future non-line-of-sight (NLOS) capabilities must be developed that perform roles currently accomplished by medium artillery and mortars. It is imperative that we avoid another generation gap with maneuver systems. A capability for near shoot-on-the-move fires is important. A precision munitions suite with a 40-50km range must accompany this capability.

In concert with NLOS development, we must leverage FCS technology development while raising the level of MLRS capabilities; thus, the need for High Mobility Artillery Rocket System (HIMARS) evolution. HIMARS is an Objective Force system but maintains a need to exploit increased capabilities for unmanned operational reach at extended ranges.

Challenges abound, but solutions can and must be developed. Increased system strategic deployability and tactical mobility equal to the supported force will allow us to get to the fight. Optimized delivery systems, munitions, and organizations will provide immediate responsiveness while allowing higher echelons to monitor or influence the current fight. Effects coordination and generation will allow field artillery to fulfill its inherent mission—"to provide responsive fires and to integrate and synchronize the effects of fires, both lethal and nonlethal, to achieve the supported commander's intent."

Systems

Legacy Force. Near-term modernization actions consist of both equipment modernization and force structure changes necessary to achieve the maximum capability within the allocated budget. Equipment modernization strives to make incremental changes to existing systems, embedding situational awareness and maintaining digitization momentum while extending their service life and maintaining overmatch until they can be replaced. Fielding of Crusader to the Counterattack Corps and subsequently cascading M109A6 Paladins to displace older M109 series howitzers in ARNG division artilleries is paramount. Upgrading of Firefinder radar, fielding of Advanced Field Artillery Tactical Data System (AFATDS) (see Annex E, Information Superiority, for details), and the start of an upgrade to the MLRS/HIMARS system to enable it to fire the new suite of munitions are key to this effort. Force structure changes address

critical shortfalls in warfighting capability. During this period, MLRS and M198 units will reorganize. These force structure changes, together with modernization efforts, will meet the critical near-term needs of field artillery.

To shape the battlespace and conduct decisive operations, field artillery will move towards munitions centrality. Rockets and missiles will be developed and procured that extend their range and lethality and provide the corps commander with a true organic, deep-strike capability. The Army will also begin production of smart and brilliant munitions, greatly increasing lethality against selected high-value targets while decreasing logistical and ammunition requirements.

Interim Force. In the midterm, field artillery will complete development and begin to field systems required to fully support the Army as we transition to the Objective Force. We will begin procurement of some of the next generation of systems in support of both light and heavy forces. Key among these are the lightweight 155mm (LW155) howitzer, the HIMARS, and the AN/TPQ-47 Firefinder Radar System. LW155 and HIMARS will replace all M198 howitzers in the Army and provide a mobile, deployable, deep-strike capability for early entry operations. LW155 will also be fielded to the Interim Brigade Combat Team (IBCTs) beginning in FY05. Until then, M198s will provide cannon support to these highly mobile forces. HIMARS, while not organic to the IBCTs, will also be available to provide deep fires as needed. Munitions centrality will

continue with a suite of long-range precision strike weapons that compensate for a smaller force and a Firefinder AN/TPQ 47 radar capable of targeting at operational depths. Profiler, the next generation meteorological system, will be fielded to the entire force and will provide for target area meteorological information critical to accurate fires.

Objective Force. In the far term, modernization will achieve field artillery's goals and position field artillery to meet the requirements of the Objective Force. Munitions S&T should provide for the ability to procure smaller, lighter, more mobile weapons platforms capable of effective fire support throughout the battlefield. There are a number of FCS designs currently being considered by the Army, and no decision is expected for several years. However, it is envisioned that the indirect fire platform will replace both 105mm and 155mm systems throughout the Army. HIMARS Pre-Planned Product Improvement (P3I) will provide a lightweight, deployable weapons platform to support the Objective Force division and echelons above division commanders. This platform will be developed to support specific munitions rather than vice versa. Technological advances will be applied to target accuracy, artillery acquisition, and area meteorology systems in support of the Objective Force. Advances in composite materials and ballistic protection technology will be retrofitted to existing systems to reduce weight and increase deployability.

Discussion of Equipment

Crusader



Description. Crusader is field artillery's highest priority combat system and a technology carrier for future Department of Defense (DoD) systems. Crusader is a fully digital, networked, fire support system consisting of a self-propelled, 155mm howitzer and its dedicated resupply vehicle. This system provides significant increases in range, accuracy, rate of fire, lethality, mobility, and survivability over the current M109 series fleet.

Operational Requirement. Crusader will be the indirect fire support system providing fires in support of mechanized maneuver forces on the future battlefield. It provides a critical augmentation option for Interim Force artillery. Crusader enables the United States to regain indirect fire dominance by providing significant increases in range, mobility, and responsiveness, thus releasing maneuver forces from their current supporting artillery limitations. Crusader will be the keystone fire support system of Army XXI, *Joint Vision 2020*, and an integral component of the future Army. Crusader provides a strategically

mobile, cost-effective program, providing full spectrum fire support for maneuver forces. Crusader will increase the overall combat effectiveness of the total force by up to 53%, while reducing the logistics burden 15-25%. Crusader provides three times the operational capability of current systems with the same strategic lift. Crusader will revolutionize the future battlefield, providing unmatched rate of fire, responsiveness, and accuracy. Crusader restores U.S. Army fire support dominance.

Program Status. Crusader is on track to begin fielding in FY08. Milestone II is presently scheduled for 2QFY03. The FY02 President's Budget (PB02) allows the program to continue in a fully funded posture as we move forward to procure 480 systems.

Multiple Launch Rocket System (MLRS)

Description. The MLRS M270A1 launcher supports Army Transformation by providing the Counterattack Force with zero-miles recapitalization and operational upgrade to the M270 launcher. The M270A1 program will provide the launcher with 10-15 years of additional life. The upgrades correct deficiencies found in the M270 and include the Improved Fire Control System that updates electronics and adds Position Navigation (POSNAV)/Global Positioning System (GPS) required for Army Tactical Missile System (ATACMS) variants and guided rockets while reducing support costs by 31%.

Operational Requirement. The M270A1 will be capable of firing both



legacy MLRS munitions and the future Objective Force MLRS Family of Munitions (MFOM) such as Guided Multiple Launch Rocket System (GMLRS), ATACMS IA and II missiles, and all future rocket and missile variants. The currently fielded M270 launcher cannot fire the objective munitions. The M270A1 Improved Launcher Mechanical System will decrease slew time by 82% and decrease reload time by 38% while decreasing support costs by 39%. A total rebuild of the M993 carrier and the M269 launcher loader module will also be accomplished. The M270A1 will be fielded to both Active Component (AC) and Reserve Component (RC) units of the Counterattack Force.

Program Status. The M270A1 is in Low-Rate Initial Production (LRIP), with rollout of the first launcher in July 2000. The program is on schedule for Initial Operational Test and Evaluation (IOT&E) in 4QFY01.

Paladin

Description. Similar to earlier M109 models, the Paladin is a fully tracked, armored vehicle with a 155mm howitzer. The Paladin includes an onboard ballistic computer and navigation system, secure radio

communications, improved cannon and gun mount, automatic gun positioning, automotive improvements, improved ballistic and nuclear, biological, and chemical (NBC) protection, driver's night vision capability, and built-in test equipment. Compared to the earlier M109s, the Paladin has improved responsiveness, survivability, lethality, and reliability.



Operational Requirement. Paladin's mission is to provide indirect fire support to the Army's heavy divisions and armored cavalry regiments.

Program Status. First unit equipped was in FY93. Completed fielding to the AC; currently fielding the remaining ARNG battalions. Currently fielding the remaining ARNG enhanced Separate Brigade (eSB) field artillery battalions. There still remain 14 additional ARNG divisional battalions that need to replace M109A5s with M109A6s. A total of 950 howitzers have been received; seven more are to be delivered in FY01.

Bradley Fire Support Vehicle (BFIST)

Description. BFIST is a full-tracked, armored Fire Support target acquisition vehicle designed to provide heavy force targeting and Fire Support

planning. Using the Bradley M2A2 ODS chassis, it provides the ultimate in crew protection and vehicle survivability while offering the speed and mobility needed to keep pace with maneuver forces.

Operational Requirement. Its integrated systems provide maximum commonality with the current Bradley fighting vehicle fleet. Major components of this system include the Bradley Eyesafe Laser Rangefinder, Ring Laser Inertial Gyroscope Navigation System, Hull Targeting Station, and targeting on-the-move capability. Crew survivability and mobility is significantly enhanced over the Vietnam-era M113 currently used.

Program Status. Current funding leaves a three-year gap in synchronization of BFIST fielding with maneuver force Bradleys. Additionally, BFIST will be fielded only to field artillery battalions whose maneuver units have M2A2 ODS or M2A3 Bradley variants. Depending upon Bradley fielding, this may be insufficient to equip all AC units. Regardless, it will not equip the heavy enhanced separate brigades in the ARNG. Units that do not receive BFIST will receive Striker.

The improved capabilities of AFATDS, the Forward Entry Device (FED), and other fire support systems that support information dominance keeps fire support information dominance during the near- and midterms. However, AFATDS will not meet the requirements of the Army after 2010. A draft AFATDS Operational Requirements Document (ORD) specifies requirements for the long

term, identifying requirements for an effects-based system. An effects-based system will have the capability to establish, alter, or terminate sensor-to-shooter links in seconds without lengthy coordination and will have visibility and management authority over all fires assets without regard to source—including air, naval, and space systems. The planned Effects Control System (ECS) program will meet those requirements. ECS program funds begin in FY08. A funding gap between the last version of AFATDS and the beginning of ECS will be addressed during the budgeting process.

Army Tactical Missile System (ATACMS)

Description. ATACMS missiles are the corps commander's organic, deep strike weapons. They are being developed as a logical series of improvements to range, accuracy, and lethality. Missile production is continuous with each new block improvement cut into the existing production line, when ready. ATACMS Block I proved its effectiveness during



Operation Desert Storm.

Operational Requirement. ATACMS Block IA (in production) increases the range from 165km to 300km by reducing the Anti-Personnel/Anti-Materiel (APAM) payload that is effective against stationary, soft targets. ATACMS Block II (beginning LRIP) significantly improves the lethality by incorporating Brilliant Anti-Tank (BAT) to effectively engage

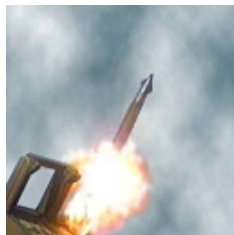
moving armor formations or P3I BAT to engage moving or stationary high-priority targets. ATACMS Block IIA Research, Development, Test And Evaluation (RDT&E) carries P3I BAT and increases the range to 300km. P3I BAT will effectively engage cold, armored targets.

Program Status. The ATACMS program was restructured during the budget planning process. Block II procurement was stretched three years and Block IIA was killed. Block II BAT P3I first unit equipped (FUE) begins in FY05.

Guided MLRS (GMLRS)

Description.

GMLRS supports the Objective Force by providing division and corps commanders with a precision munitions capability to ranges of 15-60km. GMLRS is a major upgrade to the M26 series MLRS rocket with the objective of integrating a Guidance and Control (G&C) package and a new rocket motor to achieve greater range and precision accuracy. The improvement in accuracy (<3 Mil Concept Evaluation Program (CEP)) will reduce the number of rockets required to defeat targets at 60km or greater ranges, reduce the number of launchers required per fire mission, reduce collateral damage, and directly contribute to reducing the logistical footprint of the Objective Force. A self-destruct fuze will reduce hazardous duds to <1%. GMLRS- Unitary will provide the Objective Force with a low-collateral damage rocket capable of



destroying high-payoff surface targets in complex and urban terrain with pinpoint accuracy.

Operational Requirement. GMLRS rockets will replace M26 rockets, which will begin shelf-life expiration in FY05 and which will be completely expired by FY13. GMLRS and GMLRS-Unitary will be fired from HIMARS and from HIMARS P3I launchers. GMLRS and GMLRS-Unitary will also be fired by Counterattack Force M270A1 launchers, providing a critical capability during the period of operational risk while the Army transforms.

Program Status. GMLRS Engineering and Manufacturing Development (EMD) is an international program with the United Kingdom, Germany, France, and Italy, and with an RDT&E 50/50 cost-share agreement between U.S. and European partners. The United States is managing the prime contract. LRIP is planned to start in FY03. The current programmed GMLRS procurement rate is not adequate to replace M26 rockets by their expiration in FY13. GMLRS-Unitary is in concept development and requires funding for RDT&E.

High Mobility Artillery Rocket (HIMARS)

Description. HIMARS will provide early-entry forces with MLRS capability in a lighter weight, more deployable system. Mounted on a medium tactical vehicle, HIMARS is transportable on C-130 aircraft. It provides full MLRS family-of-munitions capability yet requires 70% fewer airlift resources to transport a battery.

Operational Requirement. HIMARS is a C-130-transportable wheeled version of the MLRS launcher that is mounted on a five-ton Family of Medium Tactical Vehicles (FMTV) truck chassis. It will fire the entire MLRS family of rockets and missiles. HIMARS has the same command, control, and communications (C3) and the same three-man crew as the M270A1 launcher but carries only one rocket or missile launch pod/container containing six rockets or one Army tactical missile. The HIMARS program has been accelerated to achieve fielding of two battalions in FY05 versus one in FY06. HIMARS will be fielded to two AC battalions and 14 ARNG battalions. The HIMARS P3I will be in the Objective Force.



Program Status. HIMARS participated in the Rapid Force Projection Initiative (RFPI) Advanced Concept Technology Demonstration (ACTD) in 1998. On 30 September 2000, three prototypes completed a two-year extended user evaluation (EUE) in the XVIII Airborne Corps Artillery. On 26 September 2000, Headquarters, Department of the Army (HQDA) approved XVIII Airborne Corps Artillery retention of the three prototypes as an operational capability until HIMARS fielding in FY05. The Marine Corps System Command (MCSC) and the Program Executive office (PEO) for Army tactical missiles

are in the process of signing a Memorandum of Agreement (MOA) for the Marines to purchase two HIMARS for test and evaluation purposes. Congress is providing an FY01 plus-up of \$17.3M for this effort. The Marines plan to acquire a total of 45 launchers for an FY08 Initial Operating Capability.

Lightweight 155mm Howitzer (LW155)

Description. LW155 is a joint Army/U.S. Marine Corps program to develop a 155mm towed artillery system to replace the M198 towed howitzer. This system incorporates state-of-the-art design, high-strength/low-weight materials, and a digitization package to make this the premier towed artillery system worldwide.



Operational Requirement. The LW155 provides full spectrum fire support capability, achieving increased operational thresholds in lethality, survivability, mobility, deployability, and sustainment. This system provides maneuver forces with greater firepower, while reducing overall system vulnerability. The LW155 provides increased flexibility, responsiveness, and accuracy with the incorporation of digital fire control. This system maximizes the fire support provided to early entry and light forces,

providing range, accuracy, and durability previously unattainable.

Program Status. Current plans call for LW155 to be fielded to the 10th, 25th, and 29th Infantry Divisions, 2nd Armored Cavalry Regiment, and two nondivisional AC and seven nondivisional ARNG battalions. A total of 273 howitzers are currently funded for Army procurement. Given nonavailability of an affordable Interim Armored Vehicle (IAV) howitzer, LW155 has been approved as an acceptable solution to support the IBCT. An additional 114 howitzers will be required to meet all requirements, replacing all M198s. This requirement is currently unfunded.



Striker

Description. Striker is the fire support component of the Brigade Reconnaissance Team. Using common components from the BFIST program, Striker provides a viable platform to conduct fire support target acquisition and fire support planning for the maneuver brigade commander.

Operational Requirement.

Using the HMMWV M1025A2 chassis, Striker provides responsive fire support planning and target acquisition from an



air-droppable, C-130-transportable platform, while offering the speed and mobility needed to keep pace with maneuver forces. Its integrated systems provide maximum commonality with the current Bradley fighting vehicle fleet. Major components of this system include the Ground/Vehicular Laser Rangefinder and Designator, AN/TAS-4 Night Sight, Ring Laser Inertial Gyroscope Navigation System, and integrated Targeting Station.

Program Status. The objective of 770 systems is fully funded; LRIP contract was signed January 1999. IOT&E is scheduled for 3QFY00; MS III to be conducted in 1QFY01.

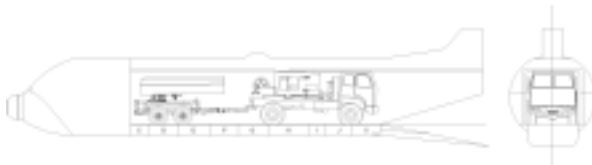
Firefinder AN/TPQ-47 (Q-47)

Description. The Firefinder AN/TPQ-47 (Q-47), a mortar, artillery, rocket, and missile locating radar, is the lynchpin counterfire detection system for the Army's IBCTs. It will replace the aging AN/TPQ-37 artillery locating radar. The Q-47 system will be fielded to each of the IBCTs and a one-for-one replacement for existing Q-37 requirements. Technically, the Q-47 will double the detection range of the current AN/TPQ-37 artillery with performance out to 60km while improving accuracy and target throughput. Additionally, the Q-47 will provide a broad spectrum of target detection by providing mortar detection



to 15km, rocket detection to 150km, and missile launch detection out to 300km. The Q-47, in many cases, will be the first electronic eyes on the battlefield providing responsive information on enemy fires and providing an invaluable force-protection tool in Small Scale Contingencies (SSCs) and Stability and Support Operations (SASOs).

Operational Requirement. The system will use the standard Army Light Medium Tactical Vehicles in a highly mobile, transportable, and survivable configuration.



The system's mission essential components will be capable of roll-on/roll-off of a single C-130 aircraft for rapid deployment. The program will further leverage the AN/TPQ-36(V)8 Electronics Upgrade program by using the same Operations Central shelter currently being fielded.

Program Status. The Q-47 program has started construction of the first EMD system. FY04 will see construction of the first four systems in a low-rate initial production. These systems will also be incorporated into developmental test and the Initial Operational Test and Evaluation (IOT&E).

**Lightweight Laser
Designator/Rangefinder (LLDR)**

Description. The LLDR provides Fire Support teams with a man-portable

system to accurately locate and designate targets.

Operational Requirement. The LLDR replaces the current Ground/Vehicular Laser Locator Designator (G/VLLD) that is large and extremely maintenance intensive.



Program Status. First unit equipped will be in FY03 but ARNG fielding will not begin until FY12. Last unit equipped is scheduled for FY16.

**Gun Laying and Positioning System
(GLPS)**



Description. The GLPS will provide both positional and directional information to light units to assist them in providing accurate, predicted fire.

Operational Requirement. The GLPS provides increased responsiveness and enhances accuracy of the positioning and directional capability of each howitzer (azimuth/deflection) in a firing battery. The system will allow the field artillery to reduce maintenance costs, equipment requirements, and personnel.

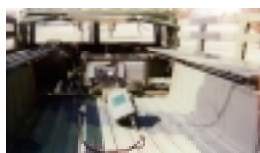
Program Status. Increased funding to procure additional GLPS enables

fielding to the Total Army. GLPS began fielding to both AC and ARNG units in FY00.

Improved Position and Azimuth Determining System (IPADS)

Description.

IPADS provides a robust inertial survey capability.



Operational Requirement. Although the field artillery is leveraging GPS technology to enhance the accuracy and responsiveness of target acquisition and self-location, GPS vulnerabilities and limitations exist. Current technology can produce an IPADS with significantly higher reliability than current PADS.

Program Status. IPADS should begin fielding to both the AC and ARNG in FY04. However, the program is unfunded for 70 systems (M270A1 battalions).

Assessment

Fire Support maintains redundant systems across the fleet. It is essential that we reduce the procurement of similar systems in the future, generating commonality and reducing Operations and Maintenance (O&M) costs. Reduction in the numbers of systems fielded may also be appropriate but will require analytic study from appropriate models and scenarios.

Throughout Transformation, it is essential that we maintain or enhance present capabilities to maintain the warfighting capabilities necessary to

fight and win, if called upon to do so. Programs, including Crusader and M270A1/HIMARS, must remain on track. Cannon requirements for the IBCTs must be accepted by the Army and changed to the LW155. We must aggressively pursue solutions to sensor-to-shooter latency issues. Munitions enablers to ensure warfighting capabilities must be restored selectively. Unfortunately, with limited smart and discriminating munitions (quantities and capabilities), area munitions with associated tonnage remain a core capability. However, we firmly understand that we must achieve greater relevancy, specifically in urban and complex terrain. Thus, the need to restore funding for the MLRS Smart Tactical Rocket (MSTAR) program and establish a viable program for Excalibur with integrated “smart” munitions are essential.

Finally, we must determine future requirements and essential capabilities required of the NLOS FCS. Critical needs must be addressed early and we must focus the research and development efforts and procurement of today’s programs toward the future Objective Force requirements.

The PB02 allows us to continue with the development and funding of several systems paramount to modernization efforts; namely, to fully fund Crusader and address LW155 requirements for the IBCTs. However, there are several noteworthy shortcomings that will more than likely not be met due to funding shortfalls. These include platform systems not fielded to the ARNG divisions—the M270 (3x6), LW155, and Paladin.

Also, some current training and wartime ammunition requirements are unfunded. Additional resources will ensure that these widespread

requirements are met and we remain a relevant and integral element of the Army, present and future.